

have like advantages. Very fine work is done by the Candy filter, which dispenses with precipitants, and owes its efficiency to oxidium, a substance with properties akin to those of spongy platinum. Cheapness in working is a feature of this installation (Fig. 1), and the effluent is certified by the highest authority to be excellent.

Great interest has been taken of late in the ozone purification processes, which are in operation at Wiesbaden, Nice, Philadelphia, and elsewhere. The chief difficulty in the meantime is to reduce the cost of working to something approaching the outlay for mechanical filtration by other means. Of the efficiency of ozone treatment there can be no question. The bacteria are practically eradicated. The filtrate is sparkling and palatable, even when the raw water is very bad. Progress has been made in reducing costs, and in particular the Howard-Bridge

much longer period, and there is considerable saving of space and of working expenses.

A necessary adjunct to all filtering appliances is a regulator to control the speed of the flow. Filters in which precipitants are employed also require a regulator for adjusting the dosage to the amount of water passing, and various attempts have been made to perfect an appliance for this end. Variations in the state of the raw water have also to be considered.

In the course of distribution of the filtered water to consumers, impurities creep into the mains and service pipes, the chief being iron oxide and filaments of crenothrix, and in special cases lead and its compounds; but by suitable means all these can be eliminated, and without much outlay. On the whole, the application of scientific method and research to the technicalities of water purifi-

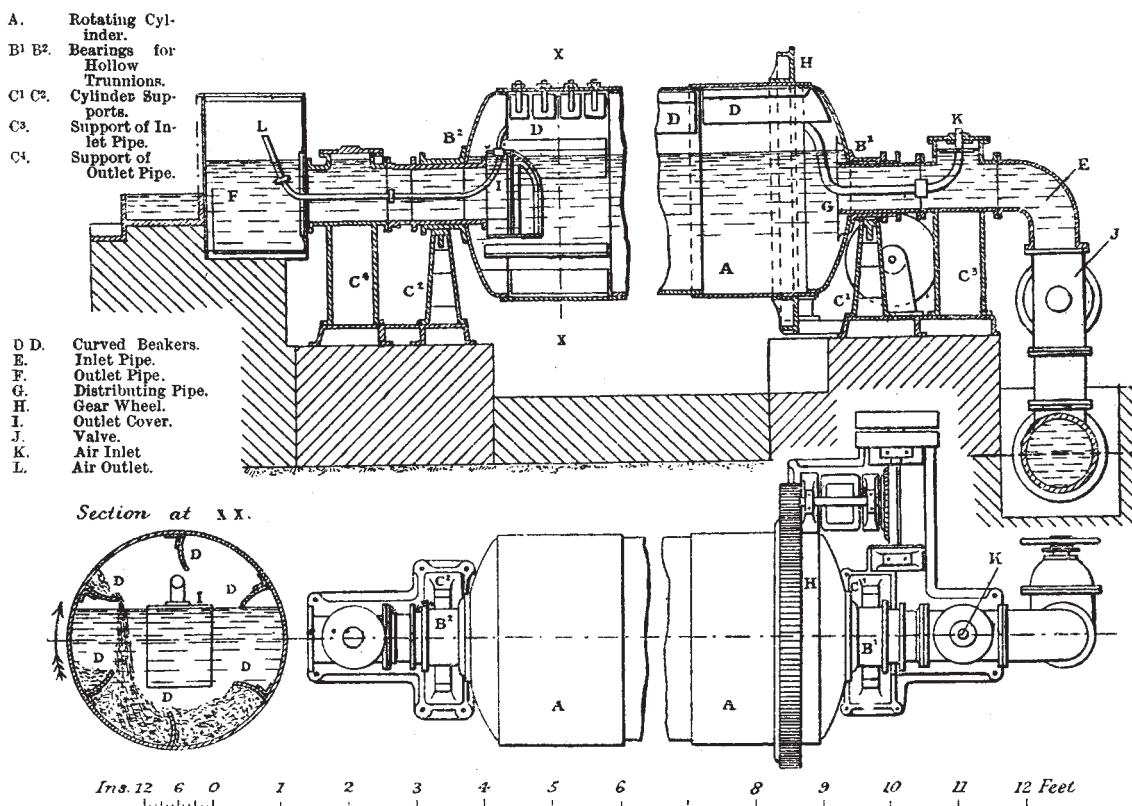


FIG. 3.—Rotating Cylinder containing fragments of Iron (Anderson).

system effects a saving by collecting the unused ozone (see Fig. 2, d) and returning it to the incoming stream.

Many appliances are being tested at Paris for the purification of river water, and notable results are being obtained from the Anderson system. The precipitant in this case is iron oxide. So much as 3 grams per cubic metre is taken up by the raw water in traversing cylinders charged with scrap iron, and the oxide serves to precipitate fine silt and plankton, and finally to form a filtering *couche* on the sand beds (Fig. 3). It is here that the sedimentation by tortuous movements, and by conducting the flow over and under baffles, has been found to give such admirable results.

Another remarkable system which is doing good work in the *banlieue* of Paris is the Puech-Chabal. Here the raw water is first passed through the roughing filters, *dégrossisseurs*, so called, in which it leaves a large part of the suspended matters. The *dégrossisseurs* are composed of grits and pebbles graded from about walnut size to gravel in the last of the series. The rough filtration enables the finishing filter to continue in operation for a

cation have brought about many valuable improvements, and it may be expected that the future has much in store for the water engineer.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

CAMBRIDGE.—The following have been nominated to serve, for eight years from February 20, on the board of electors to the professorship mentioned before their names:—*Chemistry*, Prof. Wood; *Plumian*, Mr. Mollison; *Anatomy*, Dr. Langley; *Botany*, Prof. I. B. Balfour; *Geology*, Dr. A. S. Woodward; *Jacksonian*, Prof. Larmor; *Medicine (Downing)*, Dr. Fletcher; *Mineralogy*, Dr. Marr; *Political Economy*, Dr. Marshall; *Zoology and Comparative Anatomy*, Mr. F. Darwin; *Experimental Physics*, Sir W. D. Niven; *Mechanism and Applied Sciences*, Dr. Forsyth; *Physiology*, Prof. Starling; *Surgery*, Dr. Gaskell; *Pathology*, Sir T. Clifford Allbutt; and *Agriculture (Drapers)*, Prof. Biffen.

Mr. J. B. Peace, of Emmanuel College, has been appointed chairman of examiners for the mechanical sciences tripos, 1909.

Dr. W. H. R. Rivers, of St. John's College, has been nominated to represent the University on the occasion of the celebration in July of the fiftieth anniversary of the foundation of the Anthropological Society of Paris.

Dr. T. G. Longstaff will deliver a lecture in Cambridge on Friday, February 12, on his explorations in the Himalayas. A lecture will be delivered in the Sedgwick Museum at 5 p.m. on Tuesday, February 23, by Dr. Agnes S. Lewis, "On some Deserts that I have Crossed." Dr. Sven Hedin will deliver a lecture before the University on Thursday, March 4.

With the object of encouraging original research in sanitary science, the Grocers' Company offers two scholarships, each of 300*l.* a year, with an allowance to meet the cost of apparatus and other expenses in connection with the work, tenable for one year, but renewable for a second or third year, subject to the conditions of the scheme under which they are established. The next election will take place in May. Applications must be sent in before April 1 to the clerk of the Grocers' Company, Grocers' Hall, London, E.C., from whom a form of application and further information may be obtained.

The observatory syndicate has reported that, following closely on the generous gift of the Huggins instruments by the Royal Society, another offer of valuable spectroscopic instruments has been made to the astrophysical department of the observatory by Major E. H. Hills, C.M.G., R.E. Among the instruments are a four-prism quartz spectroscope with 5-inch quartz objective, a two-prism dense flint spectroscope with 4½-inch Cooke achromatic objective, and a heliostat with 12-inch flat mirror by the late Dr. Common.

MANCHESTER.—Dr. W. H. Lang has been appointed Barker professor in cryptogamic botany, and Dr. Marie C. Stopes has been appointed, for one year, special lecturer in palæobotany.

A RECENT number of *Science* announces the following benefactions to higher education in the United States. Gifts to the amount of 69,300*l.* to Princeton University, of which the largest, 40,000*l.*, was that of Messrs. David B. Jones and Thomas D. Jones, of Chicago, for the Palmer Physical Laboratory endowment fund. Other donations were 5100*l.* from the committee of fifty and 7000*l.* from the General Education Board. More than 8000*l.* has been subscribed towards a fund of 20,000*l.* to endow a chair of physiology at the University of Cincinnati, in honour of the late Mr. Joseph Eichberg. President John Thomas, of Middlebury College, states that 18,300*l.* has been contributed toward the 20,000*l.* needed to secure the D. K. Pearson building and endowment fund of 20,000*l.* By the will of Dr. James G. Wheeler, Broughton, the James Millikin University, Decatur, will come into possession of his estate, estimated to be worth from 15,000*l.* to 25,000*l.* The Ohio State University has received 2000*l.* from Mr. Robert T. Scott, Cadiz, the income to be used for the aid of poor students. From the same source we learn that Mr. John D. Rockefeller has made a further gift of 250,000*l.* to the University of Chicago. His gifts to the University now amount to more than 5,000,000*l.* At the last meeting of the board of directors of Bryn Mawr College a gift of 20,000*l.* was presented to the board by the Alumnae Association of the college, the first instalment of the sum of 200,000*l.* which the alumnae have undertaken to try to raise for the additional endowment of the college. The alumnae have made it a condition of their gift that the money shall be used for academic salaries, and they have endowed the chair of mathematics with this first 20,000*l.*, and stipulated that the money released by freeing the college from maintaining this professorship shall be used in raising the salary of each full professor in the college.

THE annual prize distribution of the Northampton Polytechnic Institute was held on Friday, February 5, when the prizes were distributed by the Earl of Halsbury, P.C. In the course of his address Lord Halsbury dealt very fully with certain aspects of technical education, particu-

larly with the progress made during the six years since he last officiated at the Northampton Polytechnic Institute in a similar capacity. It appeared to him that the world is somewhat more awake now than it was some time ago, not only in this country, but in other countries, and that people are beginning to think that unless they are to be outstripped in the battle of the industries they must look to themselves and consider in these battles, as well as in battles of another sort, that the people who sleep on what they have got are very likely to lose it, and that we in England are in danger of being left behind in the race. The need for high scientific training was emphasised by reference to the discovery of the part played by fleas on rats in the dissemination of disease, and the "Ca Canny" principle was severely condemned. The liberality of the County Council towards the institute was suitably emphasised in connection with the new buildings which were opened during the evening. The need of such institutes in view of the decadence of the system of apprenticeship was emphasised very strongly. At the end of his speech Lord Halsbury, as Prime Warden of the Saddlers' Company, announced that the company has entrusted the Northampton Institute with certain bursaries to be applied by the institute to those students in training who require such assistance, the bursaries being specially intended to assist the students in their work in the workshops during their four years' training in the day engineering courses. At the conclusion of the prize giving, Lord Halsbury proceeded to the new building, which has been erected at a cost of 9000*l.*, the funds being provided by the London County Council. In the large lecture-room of these buildings they were declared open. On the Friday evening and on the following evening some 6000 visitors inspected the institute.

THE annual general meeting of the Association of Technical Institutions was held at Grocers' Hall, London, on February 5 and 6. The business meeting on the first day was preceded by a luncheon, at which members of the association were entertained by the Grocers' Company. In proposing the toast of "The Association of Technical Institutions," Sir William White said he does not believe in the truth of the statements as to the decadence of England, but he is sure that if we are to keep the position we hold we must as a nation lose no opportunity of developing the technical institutions of the country. Sir Norman Lockyer responded, and during the course of his remarks said if Mr. Haldane had gone to the Education Office instead of the War Office, we should have had a Board of Education responsible for all education from top to bottom, instead of the truncated body we have at present. There would be a general staff, full of knowledge, directing everything, so that in a few years' time by this organisation and the administrative conditions it brought about we should have such a peace army as Mr. Haldane is endeavouring to give in the shape of a war army. At the subsequent meeting Dr. George T. Beilby, F.R.S., was elected president for 1909, and proceeded to deliver his address. If, he said, the members of the association are possessed by the belief that the industrial future of the nation must largely depend on the spread of education in science and in the application of its laws to the affairs of daily life, then they cannot escape from the conclusion that it is their particular duty to see to it that they are taking a leading part in this vitally important work. If, he pointed out, the training in technical institutions is to be modelled on the lines of the best professional standards, it is necessary to secure the active cooperation of representative men from those industries for which it is proposed to train the students. With the help of such representatives courses of instruction, practical as well as theoretical, must be organised. The same kind of reality must be given to the practical side of the work as is found in the clinical teaching of medical students, and it must be made compulsory for all who desire to obtain the full diploma of the college. On the second day Principal F. C. Forth, of Belfast, read a paper on the management of the entrance examinations giving admission to the evening classes of a technical institute, and Mr. Sidney Webb opened a discussion on compulsory attendance at evening classes.